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The typology of lithic implements from the Neolithic settlement at Kadero (Central Sudan)

The aim of this work is to present the preliminary results of the research on the Neolithic lithic assemblage from the settlement at Kadero. Materials for this study were excavated by L. Krzyżaniak during the first four field-seasons from the southern settlement deposit (Fig. 1), where the area of 336 sq. ms. was tested. As a result, a rich assemblage of lithic artefacts was obtained.

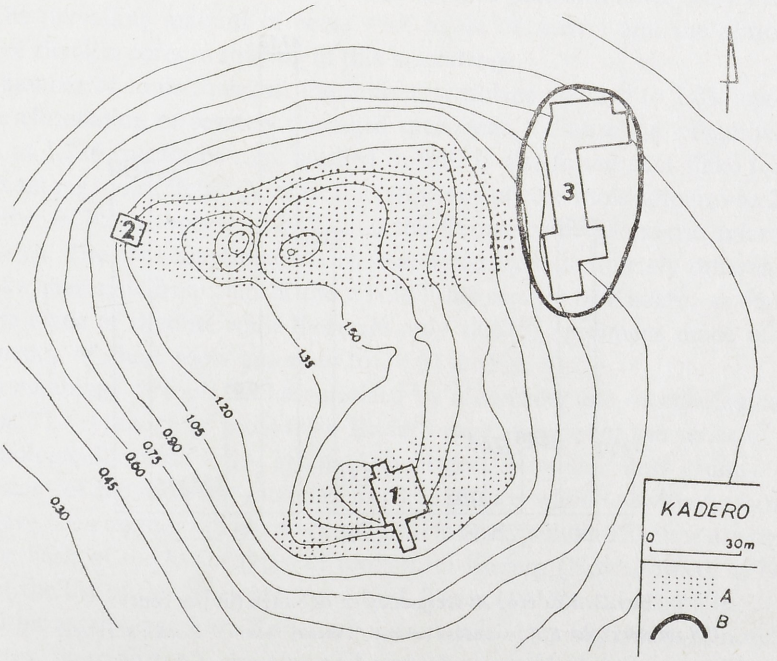

FIG. 1. Kadero. Plan of the site (after L. Krzyżaniak)
A: dwelling area; *B*: burial ground

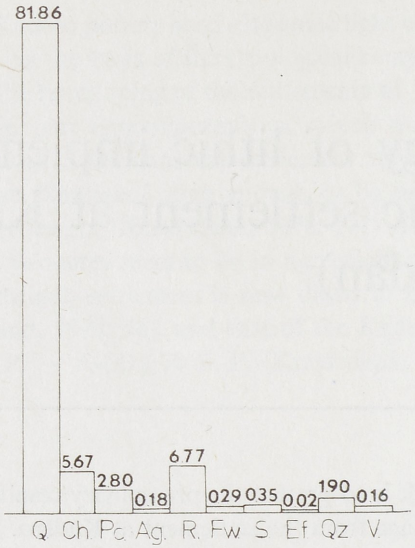

FIG. 2. Kadero. Frequency of lithic raw materials (in per cent)

Q: quartz; *Ch*: chert; *Pc*: precambrian rock; *Ag*: agate; *R*: rhyolite; *Fw*: fossil wood; *S*: sandstone; *Ef*: Egyptian flint; *Qz*: quartzite; *V*: varia

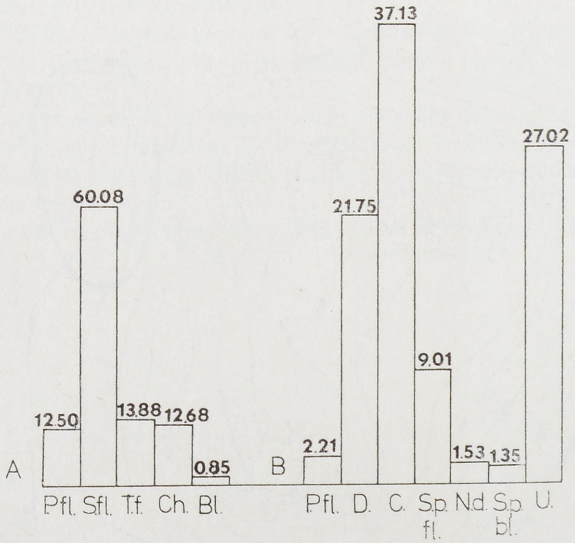

FIG. 3. Kadero. *A*: frequency of débitage (in per cent)

P.fl.: primary flake; *S.fl.*: secondary flake; *T.fl.*: tertiary flake; *Ch*: chunks; *Bl.*: blade;

B: frequency of cores (in per cent)

P.fl.: primary flake cores; *D*: discoidal cores; *C*: circumference cores; *S.p.fl.*: single platform flake cores; *Nd.*: ninety degree cores; *S.p.bl.*: single platform blade cores; *U*: undefinable cores

The raw materials utilized in the Neolithic settlement at Kadero can be divided into seven rocks: precambrian rocks, the Nile pebbles (chert, agate), quartz and quartzite, rhyolite, fossil wood, sandstone and, possibly, Egyptian flint. The intensity of use of individual raw materials was differentiated (Fig. 2) but quartz is clearly predominant (81.86%); rhyolite, chert and precambrian rocks were also used in considerable amounts. The majority of these raw materials occured in the neighbourhood of this settlement. Many of them occur in the Nubian sandstone (Whiteman, 1971). Rhyolite was accessible in the area of the Sixth Cataract, situated some 60 kms to the north of the settlement. The possible find of Egyptian flint could have been, however, an import, as its nearest deposits are situated in the region of Sinn-el-Kaddab, in the area of the Second Cataract (Haaland, 1972: 97).

The Kadero assemblage has a typical flake character, with only a small amount of blade and bladelets (Fig. 3). The débitage is characterized by the exceptionally large amount of quartz (85.33%). The presence of side blow flakes is interesting although their number is very small.

The cores are represented mainly by flake cores (98.65%) and there exists a small frequency of used cores for the manufacturing of blades and bladelets (1.35%). A characteristic feature is the predominance of circumference and discoidal cores, and the low participation of single platform cores for manufacturing flakes. Cores of ninety degree type occur in small amounts. Double platform cores were not discovered. The prevailing amount of cores were made of quartz and the almost total absence of rhyolite cores is striking in this assemblage.

The number of tools found in the lithic assemblage amount to 1,387 specimens. After the elimination of severely damaged specimens, of unsound cognitive value, as much as 1,226 specimens were studied in full. It was found that flake forms are prevalent among tools (56.69%), while the frequency of core tools amounts to 22.59%. The number of blade tools is 12.39%, and the frequency of geometric microliths is low (7.34%). The tool assemblage is characterized by a completely different structure of raw materials from that of the whole lithic sample of Kadero, as 56.45% of tools were made of rhyolite while there are only 18.67% specimens made of quartz; the frequeucy of chert tools amounts to 18.67% (Fig. 4).

The assemblage of tools is characterized by a considerable morphological differentiation. The typology of tools from Kadero took in account the series of indices of morphologically close types grouped in larger taxonomic unit groups. Ninety seven percent of the tools are included in these groups while tools that are not diagnostic have been excluded. The morphological indexes presented below are constructed on the basis of the list of types of tools from Kadero (Nowakowski, 1979), with the use of the list of the types proposed by J. Tixier (1963) as an example.

The lithic assemblage from Kadero is characterized by a high index of notches and denticulates, piercing tools, gouges, and partially retouched flakes and blades. The differences between these indices are not significant. Exceptionally low indices of backed bladelets, truncations and most of all, burins, is a characteristic feature at Ka-

dero. The assemblage is also characterised by a low index of end scrapers, side scrapers, segments and celts (Fig. 5). The comparative analysis of this assemblage shows its similarity to other assemblages known from Central Sudan.

The largest number of common traits can be observed in comparison to the lithic assemblage excavated at Esh Shaheinab (Arkell, 1953). The following traits are considered as common for these two sites:

1. Use of identical raw material,
2. Use of flake technique,
3. Very low index of burins,
4. Very low index of backed bladelets,
5. Considerable frequency of polished celts and gouges of similar morphology,
6. Presence of double-backed perforators and borers, more frequent at Kadero,
7. Morphologically similar scraping tools, more frequent at Kadero,
8. Presence of side blow flakes.

Both assemblages, however, differ significantly as regards the frequency of segments, which constitute only 6.93% of all the tools at Kadero, while at Shaheinab they amount to about 70%. There is also a much lower index of notches and denticulates at Shaheinab than at Kadero.

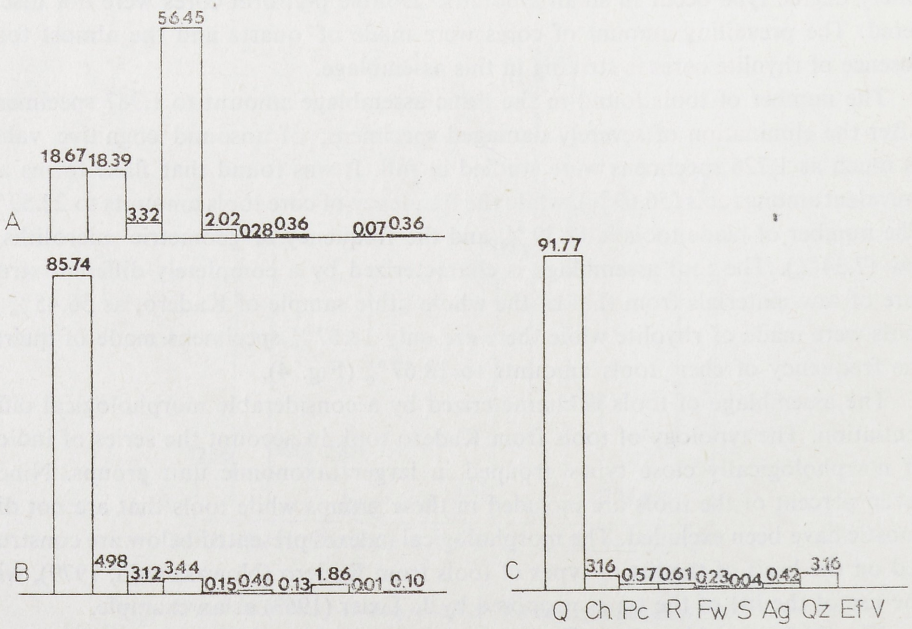

FIG. 4. Kadero. Frequency of lithic raw materials (in per cent)

A: tools; *B*: débitage; *C*: cores

Q: quartz; *Ch*: chert; *Pc*: precambrian rock; *R*: rhyolite; *Fw.*: fossil wood; *S*: sandstone; *Ag.*: agate; *Qz*: quartzite; *Ef.* Egyptian flint; *V*: varia

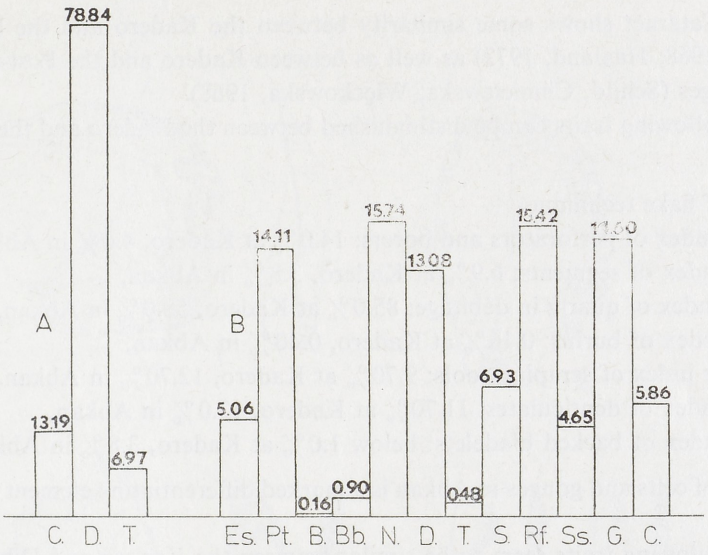

FIG. 5. Kadero. *A*: composition of the lithic assemblage (in per cent)
C: cores; *D*: débitage; *T*: tools
B: frequency of the different types of tools (in per cent)
Es. endscrapers; *Pt.*: piercing tools; *B*: burins; *Bb.*: backed bladelets; *N.*: notches; *D.*: denticulates; *T.*: truncation; *S*: segments; *Rf.*: retouched flakes; *Ss.*: sidescrapers; *G*: gouges; *C*: celts

The lithic assemblage excavated at the Khartoum Hospital site of "Early Khartoum" tradition was also compared to that of Kadero. The common traits between these two are as follows:

1. Use of flake technique,
2. Very low index of burins,
3. Similar indexes of double-backed perforators and borers,
4. Morphologically similar types of scraping tools, more frequent at Khartoum Hospital.

The following different frequencies between these two sites were found:

1. Higher index of backed bladelets at Khartoum Hospital,
2. The frequency of segments in Kadero amounts to 6.93%, while at Khartoum Hospital they constitute the largest group of tools,
3. Lack of gouges and celts at Khartoum Hospital,
4. Lack of denticulates and notches at Khartoum Hospital.

The comparative analysis indicates that these three assemblages are related to a different extent, as regards their contents. The differences in the structure of the tool group may be explained by their chronological differences and as a result of a different type of exploitation of the natural environment.

A comparison of the Kadero assemblage to those known from the region of the

Second Cataract shows some similarity between the Kadero and the later Abkan (Shiner, 1968; Haaland, 1972) as well as between Kadero and the Post-Shamarkian assemblages (Schild, Chmielewska, Więckowska, 1968).

The following traits can be distinguished between the Kadero and the late Abkan phase:

1. Use of flake technique,
2. High index of perforators and borers: 14.0% at Kadero, 4.0% in Abkan,
3. Low index of segments: 6.9% at Kadero, 3.8% in Abkan,
4. High index of quartz in débitage: 85.0% at Kadero, 58.0% in Abkan,
5. Low index of burins: 0.16% at Kadero, 0.40% in Abkan,
6. Similar index of scraping tools: 9.70% at Kadero, 12.70% in Abkan,
7. High index of denticulates: 11.70% at Kadero, 13.0% in Abkan,
8. Low index of backed bladelets: below 1.0% at Kadero, 3.8% in Abkan.

The lack of celts and gouges in Abkan is a marked differentiating element from Kadero.

The following traits seem to be similar between the Kadero and Dibeira West 4 and Dibeira West 50 assemblages of Post-Shamarkian tradition (Schild, Chmielewska, Więckowska, 1968):

1. Use of flake technique,
2. Similar notches index,
3. Similar denticulates index,
4. High frequency of quartz in débitage,
5. High index of partially retouched flakes,
6. Presence of side blow flakes,
7. Presence of unpolished celts.

The lack of polished celts and gouges in these essemblages is a differentiating element from Kadero.

The comparative analysis seems to show that there is a certain relationship between the lithic assemblages from the Kadero settlement and those of the other sites from the Sudan. However, the Kadero assemblage is clearly related to that originating from Shaheinab.

The common elements between the Kadero and Abkan and Post-Shamarkian assemblages seem to be the similar tendency in the development of the lithic industry which was manifested by:

1. Increase of quartz in débitage,
2. Increase of backed bladelets frequency,
3. Clear decrease of burin frequency,
4. Considerable increase of groovers and borers.

This tendency may be the result of similar changes in the method of the environmen exploitation (Haaland, 1972), with the Nile Valley acting as a unificating factor. Thte

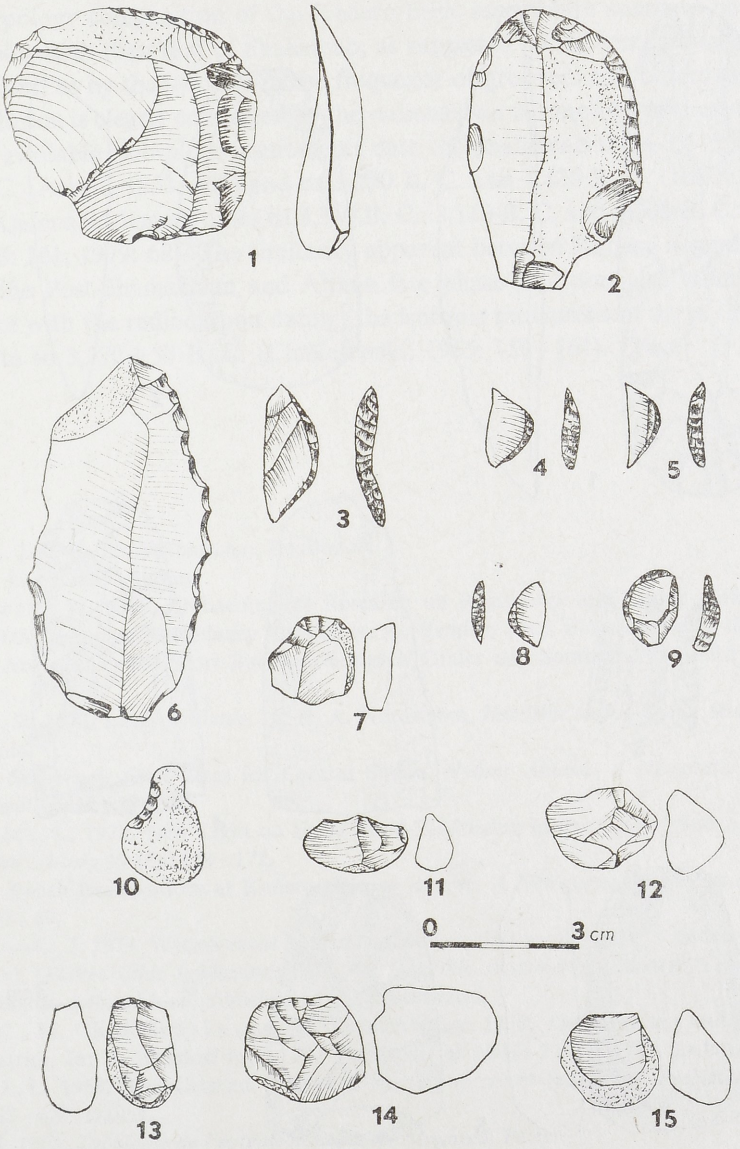

FIG. 6. Kadero. Lithic assemblage

1 - 2, 7: End scrapers; *3 - 5, 8, 9*: Segments; *6*: Denticulate; *10*: Notch; *11 - 15*: Cores

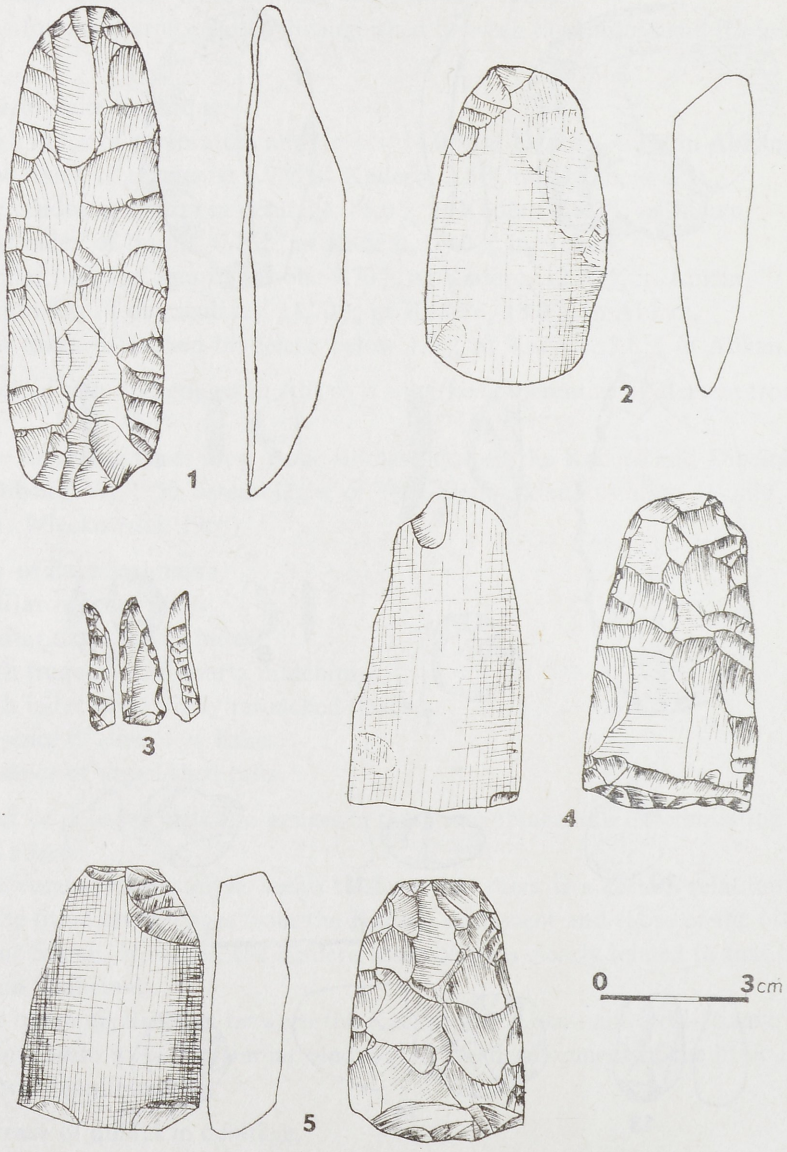

FIG. 7. Kadero. Lithic assemblage

1: Unpolished celt; *2*: Polished celt; *3*: Groover; *4 - 5*: Gouges

hypothetic presence of Egyptian flint at Kadero would be in harmony with the other traits of northern origin known from this Neolithic site (Krzyżaniak, 1978).

The typology composition of the Kadero lithic assemblage seems to be younger in its development than that of Shaheinab, as suggested by the low frequency of segments, as well as by the increase in the frequency of groovers and borers at Kadero. This conclusion is clearly confirmed by the radiocarbon chronology of these two sites. Presently available isotopic measurements date the Shaheinab to ca 3,445 B. C. and 3,110 B. C. (Arkell, 1953: 107) and ca 3,290 B. C. and 3,420 B. C. (Haaland, 1979: 56). The Kadero settlement dates ca 3,310 B. C., 3,110 B. C. and 3,330 B. C. (Krzyżaniak, 1978: 161; 1979: 68). The similarity apparent between Kadero assemblage and those of the Post-Shamarkian and Abkan late phase tradition also seem to be in accordance with the radiocarbon dating; the isotopic measurement dates the Dibeira West 4 site to 3,270±50 B. C. (Chmielewski, 1965: 159 - 161).

References

Arkell, A. J. 1949. *Early Khartoum.* London.

– 1953. *Shaheinab.* London.

Chmielewski, W. 1965. Archaeological Research on Pleistocene and Lower Holocene Sites in Northern Sudan, Preliminary Results. In: F. Wendorf (ed.), *Contributions to the Prehistory of Nubia*: 147 - 164. Fort Burgwin Research Center and Southern Methodist University Press.

Haaland, R. 1972. Lithic artifacts. In: H. A. Nordström, *Neolithic and A-Group Sites*: 97 - 117. Uppsala.

– 1979. Some new C-14 dates for Central Sudan. *Nyame Akuma. A Newsletter of African Archaeology* 15 : 56 - 57.

Krzyżaniak, L. 1978. New Light on Early Food-Production in the Central Sudan. *Journal of African History* 19 (2) : 159 - 172.

– 1979. Polish Exacavations at Kadero. *Nyame Akuma. A Newsletter of African Archaeology* 15 : 67 - 69.

Nowakowski, J. 1979. Wytwórczość kamieniarska w osadzie neolitycznej w Kadero (środkowy Sudan). (*Flaked lithic implements from the Neolithic settlement at Kadero, central Sudan*). University of Poznań, unpublished M. A. dissertation.

Schild, R., M. Chmielewska and H. Więckowska. 1968. The Arkinian and Shamarkian Industries. In: F. Wendorf (ed.), *The Prehistory of Nubia* 2 : 651 - 767. Dallas.

Shiner, J. L. 1968. The Cataract Tradition. In: F. Wendorf (ed.), *The Prehistory of Nubia* 2 : 535 - 629. Dallas.

Tixier, J. 1963. *Typologie de l'épipaléolithique du Maghreb.* Paris.

Whiteman, A. J. 1971. *The Geology of Sudan Republic.* Oxford.